



ANNUAL
SPINE EXPERTS GROUP
MEETING 2024

Sarajevo, Bosnia and Herzegovina
November 29- November 30, 2024

**PROGRAMME
WITH ABSTRACTS**

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ANNUAL SPINE EXPERTS GROUP MEETING 2024

Organized by:

**Spine Expert Group,
ASA Bolnica,
ASA Institute and Association of Orthopedists and
Traumatologists of Bosnia & Herzegovina**

President of the Organizing and Programme Committee
Asst. Prof. **Aleksandar Vujadinović**, MD, PhD,
Department orthopedics, ASA Bolnica

PROGRAMME WITH ABSTRACTS

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Welcome address

Dear Esteemed Participants,

On behalf of the organizing committee, it is my great pleasure to extend a warm welcome to all of you to the Spine Experts Group meeting 2024. We are thrilled to have you join us for this traditional event, which brings together leading experts, professionals, and enthusiasts in the field of spine surgery from the region.

This congress represents a unique opportunity for us to come together, share our knowledge, and collaborate in advancing the state of the art in spine surgery. Over the course of the program committee collaboration, we have meticulously curated a program that encompasses a diverse range of topics, including the latest innovations in surgical techniques, cutting-edge research, and emerging technologies. Our esteemed faculty will deliver lectures, participate in discussions, and conduct case presentations designed to enhance your understanding and skills in this dynamic field.

In addition to the professional sessions, we have also organized a welcome reception and other networking opportunities for you to connect with your peers, exchange ideas, and foster new collaborations. We believe that these interactions are just as vital as the academic content, as they provide a platform for building lasting relationships and friendships within the spine surgery community.

Our venue, ASA INSTITUTE is located in Sarajevo. We encourage you to take some time to explore the city and its attractions during your stay.

We would like to express our gratitude to our sponsors, exhibitors, and partners whose generous support has made this congress possible. Their contributions have enabled us to create an exceptional educational and networking experience for all participants.

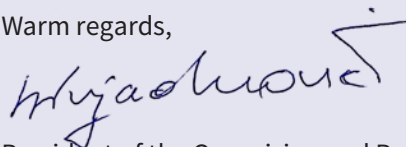
In conclusion, we hope that SEG 2024 will be both professionally enriching and personally enjoyable for you. We look forward to your active participation, engaging discussions, and the opportunity to learn from one another.

If you have any questions or require assistance during the congress, please do not hesitate to reach out to our dedicated team of organizers who will be readily available to assist you.

Thank you for choosing to be a part of this event, and we anticipate an inspiring and successful meeting.

Welcome once again and let us embark on this enlightening journey together.

Warm regards,



President of the Organizing and Programme Committee
Asst. Prof. **Aleksandar Vujadinović**, MD, PhD,
Department orthopedics, ASA Bolnica

Committees

Organising Committee

Chair: **Aleksandar Vujadinović**

Indira Musić

Merima Džaferović

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Ufuk Aydinli (Turkey)

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Congress Secretariat

ASA BOLNICA, Džemala Bijedića 127, Sarajevo, Bosnia and Herzegovina

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Venue

ASA INSTITUTE, Džemala Bijedića 127, Sarajevo, Bosnia and Herzegovina

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Programme SEG 2024.

1st Day November 29

- 08:00-08:45 Registration
- 08:45-09:00 Welcoming address
- 09:00-11:45 **Session 1: DEGENERATIVE SPINE**
Chairs: **Miha Vodičar, Matjaž Voršič**
- 09:00-09:15 Matjaž Voršič, Rok Končnik
[The cervical sagittal balance in multi-level ACDF procedures and its effect on postoperative neck pain](#)
- 09:15-09:30 Zlatko Ercegović, Adnan Čičkušić
[The role of surgery in the treatment of chronic low back pain. Medical, ethical and economical aspects](#)
- 09:30-09:45 Edin Buljugić
[Contemporary principles of physical therapy and rehabilitation in lumbar pain syndrome](#)
- 09:45-10:00 Ivan Keser, Anida Jamakosmanović, Denis Imamović
[The role of epidural steroid injections in managing lumbar pain: A six- month clinical evaluation](#)
- 10:00-10:15 Emir Begagić, Hakija Bečulić
[Development of BOILS: Bosnian Objective Instrument for Lumbar Spinal Stenosis](#)
- 10:15-10:30 Adnan Čičkušić, Zlatko Ercegović
[Surgical treatment of lumbar spinal stenosis: laminectomy or laminotomy](#)
- 10:30-10:45 Oguz Karaeminogullari
[Endoscopic Spine Surgery](#)
- 10:45-11:00 Ilir Hasani
[Spine endoscopy. The view from the surgeon perspective on implementing this new technique](#)
- 11:00-11:15 Aleksandar Vujadinović, Mahir Jašarević, Asmir Hrustić, Elvir Atić, Armin Muhović
[Thoracic endoscopic spine surgery. From glory to nightmare](#)
- 11:15-11:45 *Discussion*
- 11:45-12:15 *Coffee break*
- 12:15-14:30 **Session 2: SPINAL DEFORMITY**
Chairs: **Alexandru Thierry, Ufuk Aydinli**
- 12:15-12:40 Prof Dr Ozkan Ates (Invited lecture) (Koc Hospital)
[Navigation usage in the spinal surgery](#)
- 12:40-13:00 Doc. Dr. Mehmet Yigit Akgun (Invited lecture) (Koc Hospital)
[Two-Stage Lumbar Dynamic Stabilization Surgery](#)

- 13:00-13:30 Prof. Cagatay Ozturk (Invited lecture) (LIVGROUP)
Surgical treatment of severe spinal deformities
- 13:30-13:45 Alexandru Thierry, Raluca Ghita
Robotic Spine Surgery for Complex Deformity Cases
- 13:45-14:00 Mirza Bišćević
Degenerative lumbar scoliosis (DLS)-final stadium of spine aging
- 14:00-14:15 Ufuk Aydinli
Complications and management of spine surgery over the age of 60
- 14:15-14:30 Discussion
- 14:30-15:30 Lunch
- 15:30-17:00 **Session 3: SPINAL DEFORMITY 2nd part**
Chairs: **Miha Vodičar, Mirza Bišćević, Mahir Jašarević**
- 15:30-16:00 Prof. dr. Mehmed Aydogan (Invited lecture) (MEMORIAL)
Non fusion deformity surgery
- 16:00-16:30 Armand Dominik Škapin, Nina Verdel, Matej Supej, Janez Vodičar, Miha Vodičar
Gait biomechanics in sagittal adult deformity
- 16:30-16:45 Mirza Bišćević
Selective thoracic fusion (STF) Best invasiveness/correction ratios
- 16:45-17:00 Ufuk Aydinli
Revision of scoliosis cases which operated previously.
- 17:00-17:30 Discussion

2nd Day November 30

- 09:00-10:45 **Session 4: SPINAL TRAUMA AND CASE REPORTS**
Chairs: **Neda Trajkovska, Ilir Hasani, Stjepan Dokuzović**
- 09:00-09:15 Neda Trajkovska
Timing of spinal surgery in polytrauma patient
- 09:15-09:30 Prof. Cagatay Ozturk (Invited lecture) (LIVGROUP)
Augmentation and minimal invasive surgical treatment in osteoporotic spine fractures
- 09:30-10:00 Faruk Lazović, Dario Ivanišević, Mehmed Zahirović, Benjamin Kaknjašević
Complete thoracolumbar fracture-dislocation: timing of surgery and factors that affect treatment
- 10:00-10:15 Stjepan Dokuzović, Igor Bebek
Thoracic fracture – Dislocation with bilateral locked facet joints: an effective reduction technique
- 10:15-10:30 Cene Kopač, Marko Jug
Intraspinal pressure after spinal cord injury
- 10:30-10:45 Ilir Hasani
Spinopelvic fixation in sacral fractures. Is it enough, or we need to enhance the construct to triangular

10:45-11:00	Jošt Kokalj Thoracolumbar corpectomy and cage subsidence: our experience
11:00-11:15	Igor Bebek, Stjepan Dokuzović Nonoperative treatment for postoperative symptomatic thoracic epidural spinal hematoma
11:15-11:30	<i>Discussion</i>
11:30-11:45	<i>Coffee break</i>
11:45-13:30	Session 5: SPINAL TUMORS, INFECTIONS AND CASE REPORTS Chairs: Ufuk Aydinli, Miha Vodičar
11:45-12:00	Lovro Suhodolčan, Jure Leban, Miha Vodičar (Invited lecture) Aggressive haemangiomas. What is the appropriate treatment?
12:00-12:15	Alexandru Thierry, Raluca Ghita Surgical management of spinal tuberculosis in pediatric patients: a case series
12:15-12:30	Ufuk Aydinli Managing acute spinal cord compression in metastasis of unknown origin - weekend admission.
12:30-12:45	Mahir Jašarević, Asmir Hrustić, Aleksandar Vujadinović Decision framework for metastatic spine tumors
12:45-13:00	Armand Dominik Škapin, Jure Leban, Klemen Bošnjak, Miha Vodičar, Lovro Suhodolčan Prophylactic use of vancomycin powder reduces postoperative infection rates after lumbar spondylodesis
13:00-13:15	Neda Trajkovska Treatment of polymicrobial postoperative spinal infection – case report
13:15-13:30	Aleksandar Vujadinović, Mahir Jašarević, Asmir Hrustić, Elvir Atić, Armin Muhović Dural leakage. What is the best approach treatment? Case report.
13:30-13:45	<i>Discussion</i>
14:00	<i>Closing remarks</i>

Internet

Wireless internet connection is available, in conference hall. The name of network is **KONFERENCIJA**. No login or password is needed.

Registration and Information Desk

The Registration Desk for the SEG Conference will be located in ASA INSTITUTE (ground floor), as follows:

Friday, November 29 – 08:00-17:30

Saturday, November 30- 09:00- 14:00

Social programme

Included in the fee for participants.

Friday, November 29, 2024

19:30- 22:30, APETIT restaurant / Zmaja od Bosne 13, Sarajevo

Included in the fee for participants

Dress code: Casual

General information

Conference identification badge

A conference identification badge will be included in the conference material provided upon registration. There will be no admittance to the Scientific Sessions without the Conference badge.

Coffee Breaks

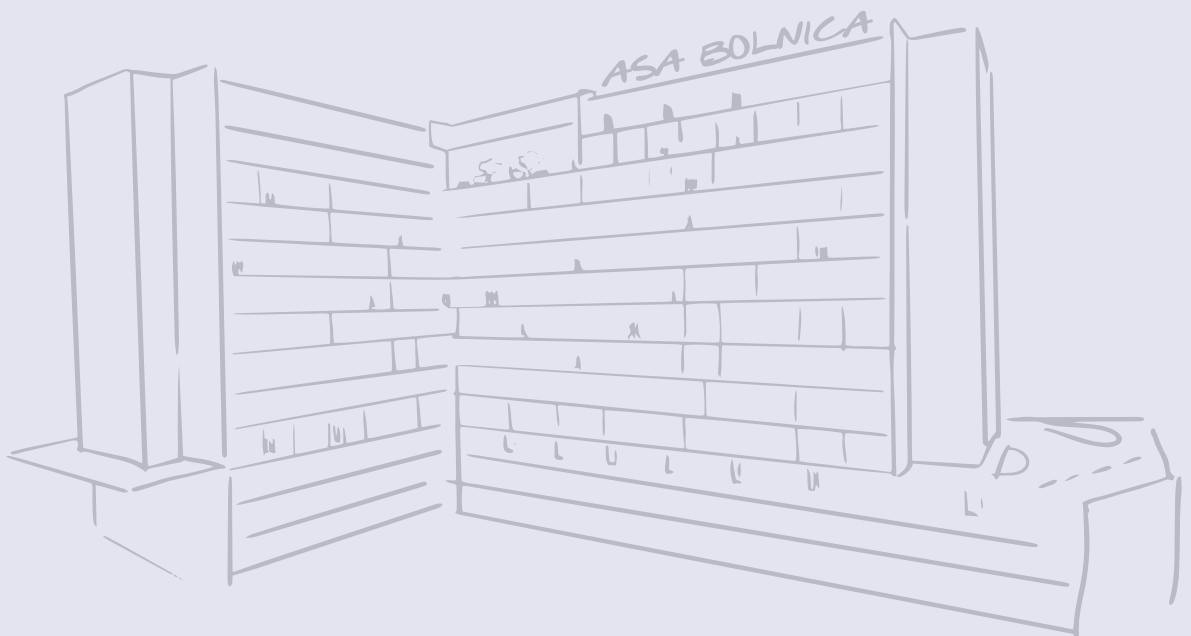
During breaks, refreshments will be served free of charge to participants wearing congress badges.

Lunches

Lunches are included in the registration fee and will be served at lunchtime in Institute, ground floor.



List of abstracts





SESSION 1.:

DEGENERATIVE SPINE

The cervical sagittal balance in multi-level ACDF procedures and its effect on postoperative neck pain

Voršič Matjaž¹, Rok Končnik²

¹ Spondylos, Maribor, Slovenia

² University Hospital Maribor, Ljubljanska 5, 2000 Maribor, Slovenia

E-mail: vorsicspine@gmail.com

Objectives:

To determine the possible relation between cervical sagittal balance and neck pain in patients having multi-level anterior cervical spine (ACS) surgery. Prospective study was made to compare the clinical and radiographic results of an anterior cervical discectomy and fusion (ACDF) surgery for contiguous two-level cervical degenerative disease (CDD). The study compared clinical as well as the radiological results.

Materials and Methods:

After applying the inclusion criteria, 40 patients who underwent the two-level ACDF procedures were included in the study.

Clinical outcomes were assessed before and at regular intervals until one year after the procedure using the Neck Disability Index (NDI), with 15% improvement in NDI and 20% improvement in VAS for neck pain defined as a clinically significant.

The Radiological assessment was achieved by using the pre and postoperative x-rays determining the parameters for cervical sagittal balance.

Results:

There was a statistically significant decrease in NDI and VAS for neck pain postoperatively ($p > .05$).

There was also a statistically significant increase in the Cobb angle postoperatively ($p > .05$). The cervical lordosis angle significantly changed to an average of 17.72°.

Conclusions:

An improvement in the cervical sagittal balance after multi-level ACDF surgery is accompanied by a reduction of neck pain. Radiological parameters of cervical sagittal balance has to be taken into account when planning surgery in order to maintain cervical alignment and thereby limit the occurrence of chronic neck pain.

The role of surgery in the treatment of chronic low back pain. Medical, ethical and economical aspects

Ercegović Z, Čičkušić A.

Department of Neurosurgery, University Clinical Center Tuzla, Bosnia and Herzegovina

Aim:

The intention of this paper is to analyze literature data regarding indications, treatment options, type of surgeries as well as outcomes of different types of treatment in patients suffering from low back pain caused by degenerative disease. In the last few decades expanded number of surgeries including minimally invasive decompressive procedures but also significant increase in number of instrumented spinal surgeries for degenerative disease were noticed. There were increased number of diagnostic imaging procedures and infiltrative pain treatment procedures.

Methods:

We completed and analyzed data in terms of indications for lumbar spinal surgery, lumbar spinal fusion surgery, epidemiology, risks, complication rate as well as economical aspects of those surgeries. Results from reviewed papers as well as experience from our institution were obtained.

Results:

The literature results showed four times expanded number of prescribed lumbar spine MRI in the period from 1994 to 2014 and four to five times higher number of pain treatment procedures. Number of the spinal fusion surgeries is expanded five times in the last decade of twentieth century. In the same time results suggested that number of disabled workers because of back pain rose by 10 percent. Paradoxically reoperation rate after spinal fusion surgery is higher than for surgery without instrumentation or bony fusion alone. Surgery with instrumentation was associated with doubling risk of complication, increased rate of transfusion by factor six and two times higher mortality rate in six postoperative weeks.

Conclusion:

Prescribing more images, opioids, injections and surgeries is not likely to improve outcome in patient with chronic low back pain. The emphasis of research efforts should be shifted from “how to perform surgery” to “who should undergo spinal surgery”. The introduction of minimally invasive spinal procedures including fusion procedures should be acceptable option in well selected cases.

Contemporary principles of physical therapy and rehabilitation in lumbar pain syndrome

Edin Buljagic, Doc. dr. sci., Specialist in Physical Medicine and Rehabilitation
Medical Center “Sporticus”

Introduction:

Lumbar pain syndrome (LPS) is one of the most prevalent musculoskeletal conditions globally, significantly impacting quality of life and functional independence. Advances in physical medicine and rehabilitation (PM&R) have introduced evidence-based approaches for comprehensive management of this syndrome, emphasizing multidisciplinary care, patient-centered approaches, and novel therapeutic modalities.

Materials and Methods:

This review analyzes contemporary rehabilitation protocols and their effectiveness in managing LPS. Clinical data were obtained from recent studies and integrated with findings from 50 patients treated at the Medical Center “Sporticus” over a one-year period. Interventions included physical therapy modalities (TENS, ultrasound, TECAR, Vakum therapy etc) and laser therapy), manual therapy, therapeutic exercise, and ergonomic education. Pain intensity was evaluated using the Visual Analog Scale (VAS), while functional outcomes were assessed with the Oswestry Disability Index (ODI).

Results:

The integrated rehabilitation program demonstrated a significant reduction in VAS scores (average decrease of 45%) and improvement in ODI scores (average functional enhancement of 35%) over a 12-week period. Manual therapy and therapeutic exercises showed the highest effectiveness, particularly when combined with education on proper posture and ergonomics.

Conclusion:

A comprehensive, individualized approach to LPS that incorporates physical therapy modalities, manual therapy, and patient education significantly improves pain management and functional outcomes. Further research is needed to optimize rehabilitation strategies and evaluate long-term effectiveness in diverse patient populations.

Keywords:

Lumbar pain, rehabilitation, physical medicine, multidisciplinary approach

The role of epidural steroid injections in managing lumbar pain: A six-month clinical evaluation

Ivan Keser¹, Anida Jamakosmanović¹, Denis Imamović¹

Introduction:

Radicular pain and chronic low back pain (LBP), often caused by nerve root compression due to disc herniation or spinal stenosis, are prevalent and challenging conditions in pain management. While surgery is often the definitive treatment for severe or progressive cases, epidural steroid injections (ESIs) serve as an essential tool in non-surgical management, offering symptom relief by addressing inflammation at the nerve root.

Aim:

This study evaluates the efficacy of ESIs performed at our institution over a six-month period, positioning them within the broader context of pain management.

Materials and Methods:

We reviewed 63 patients who received interlaminar, transforaminal, or caudal ESIs between September 2023 and March 2024. Pain was assessed using the Numeric Rating Scale (NRS) before the procedure and again at least two weeks post-procedure. Statistical analysis was performed using paired T-tests to evaluate changes in pain scores.

Results:

In the transforaminal ESI group (N=20), the mean reduction in NRS scores was 3.8 (t=6.418, p<0.0001). The interlaminar group (N=21) demonstrated a mean reduction of 3.095 (t=5.18, p<0.0001), and the caudal group (N=7) showed a reduction of 3.143 (t=4.26, p=0.005).

Conclusion:

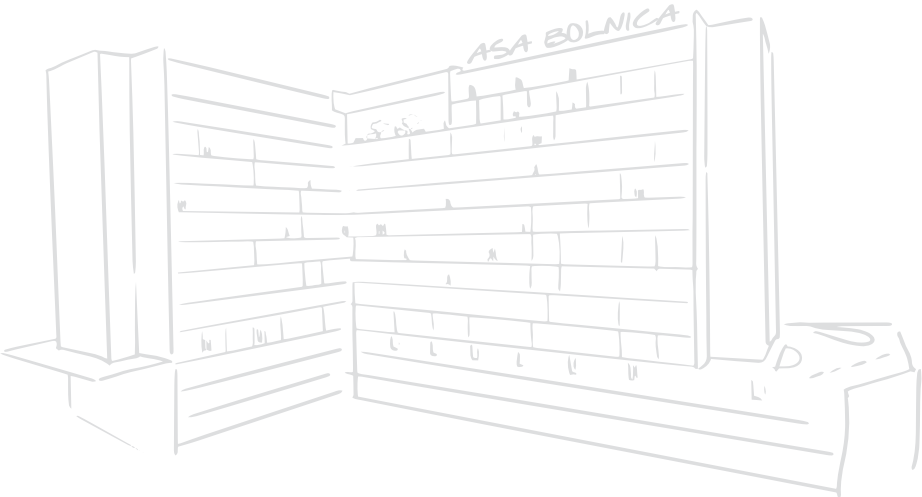
ESIs provided significant short-term relief across all patient groups, confirming their role as an effective component of non-surgical pain management. However, they should be seen as part of a broader, multidisciplinary approach that includes physical therapy and lifestyle modifications. While epidural steroid injections (ESIs) are effective for symptom management, they should not be considered a substitute for surgical intervention in patients exhibiting progressive neurological deficits or those with conditions necessitating structural correction.

Keywords:

Epidural steroid injections, radicular pain, chronic low back pain, spinal stenosis, pain management, surgical intervention.

Development of BOILS: Bosnian Objective Instrument for Lumbar Spinal Stenosis

Emir Begagić, Hakija Bečulić



Surgical treatment of lumbar spinal stenosis: laminectomy or laminotomy

Ercegović Z¹, Čičkušić A¹

Department of Neurosurgery, University Clinical center Tuzla, Bosnia and Herzegovina

Background:

Recognition that total laminectomy may cause segmental instability led to the introduction of less invasive techniques of decompression in lumbar spinal stenosis surgery.

Aim:

The goal of the our study was to compare formal laminectomy and minimally invasive decompressive procedures in terms of radiological and clinical outcome, specifically in respect to the development of postoperative spinal instability.

Methods:

A retrospective analysis of medical records for 151 patients operated on for lumbar spinal stenosis (60 patients after laminectomy and 91 patients after minimally invasive decompression – unilateral laminotomy), with available follow-up data was performed. Basic variables were analyzed in respect to clinical outcome and in regard to development of radiological instability.

Results:

Radiologic instability was present in 25,0% of patients after laminectomy, as compared to only 3,3% after laminotomy ($p < 0,001$). Regression analysis identified presence of preoperative slip ($p = 0,0001$), type of surgery ($p = 0,0009$) and number of affected levels ($p = 0,04$) as predictors of instability following surgery. Clinical outcome analysis (laminectomy vs. laminotomy) revealed favorable outcome in both treatment groups, although significantly in favor of the laminotomy group (VAS $p = 0,0067$ and RM $p = 0,0037$). Finally, difference in outcome was affected by whether radiologic instability was present or not ($p = 0,001$ for difference in outcome graded by both VAS and RM values).

Conclusion:

Our results suggest that laminectomy was associated with higher incidence of the radiological signs of the postoperative instability when compared to the minimally invasive decompression techniques. That was probably the major cause of unfavorable clinical outcome in the laminectomy group. We found unilateral laminotomy as acceptable method for decompression in patients with lumbar spinal stenosis even in those who have spondylolisthesis grade one .

Keywords:

Lumbar stenosis surgery, instability, clinical outcome

Endoscopic Spine Surgery

Oguz Karaeminogullari, Professor M.D,
Bayindir Hospital, Ankara, Turkey

Introduction:

Transforaminal endoscopic lumbar discectomy (PELD) is an effective treatment option for lumbar disc herniation. The discectomy is performed through a posterolateral approach through the triangle of Kambin. There is less damage to muscular and ligamentous structures allowing for faster rehabilitation, shorter hospital stay and earlier return to function.

Patients/methods/core:

A total of 856 consecutive patients with lumbar disc herniation were treated with PELD between 2012-2023. Among them, 512 patients were treated transforaminal, 48 by PL and 296 by Interlaminar technique. Foraminoplasty was performed in 126 of 512 Transforaminal PELD patients, mostly for L5-S1 disc herniations. Clinical outcomes were evaluated using the visual analogue scale (VAS), and modified Macnab criteria.

The mean VAS score for back pain improved from 7.6 to 1.7. The rate of excellent or good outcomes was 93 % according to modified Macnab criteria. Reherniation rate was 7.7 %. The other complications occurred were, unsuccessful surgery, DVT, hematoma and seizures. There was 1 Kauda Equina Syndrome in Interlaminar group and 12 Dysesthesia in the Transforaminal group. Dural tear occurred in 5 patients.

Discussion:

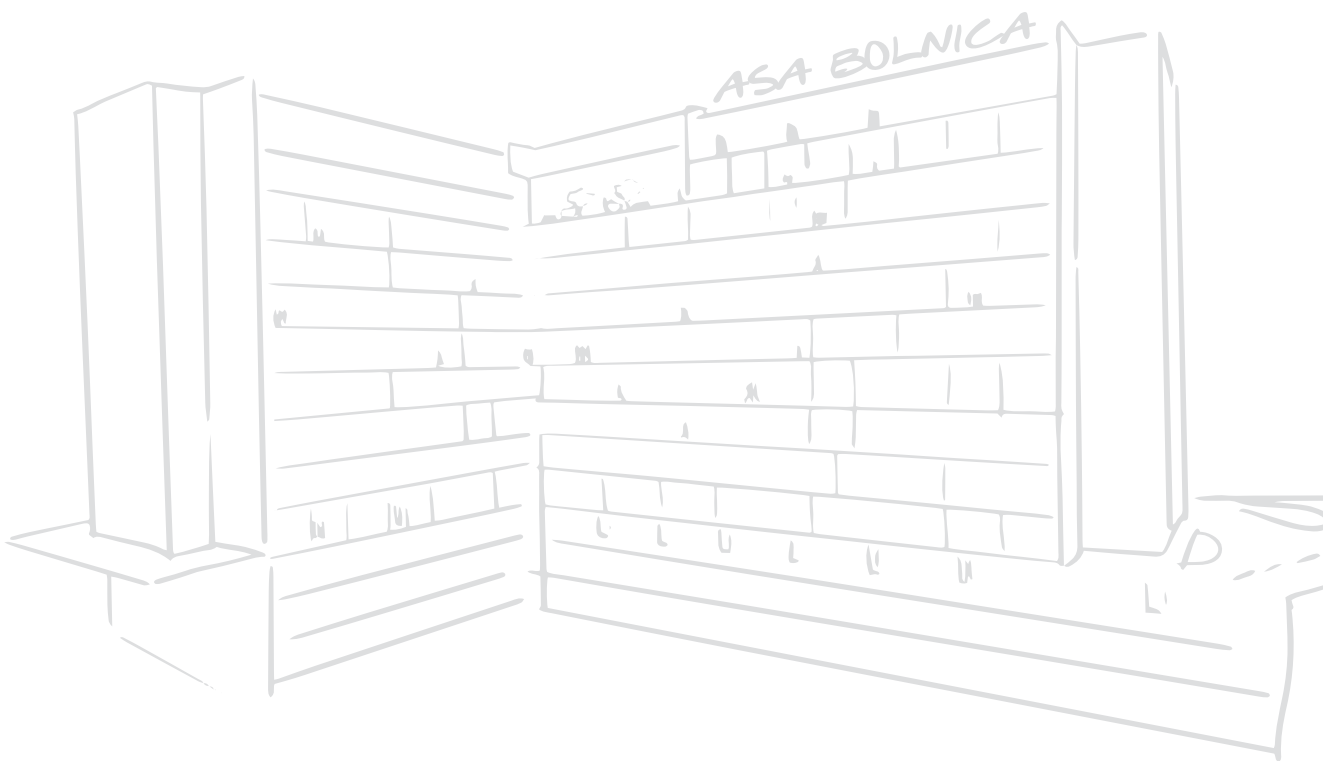
Endoscopic lumbar discectomy has progressed as an effective approach for patients requiring surgical intervention for disc herniation. With remarkable advances in endoscopic techniques and related surgical technologies, endoscopic lumbar discectomy is gaining popularity. Success and complication rates are comparable to microsurgical discectomy.

Conclusion:

Minimal invasive techniques are popular and effective in various surgical fields. Endoscopic discectomy seems to be a good alternative technique for surgical treatment of disc herniations.

Spine endoscopy. The view from the surgeon perspective on implementing his new technique

Ilir Hasani
Skopje, Macedonia



Thoracic endoscopic spine surgery. From glory to nightmare

Aleksandar Vujadinović¹, Mahir Jašarević², Asmir Hrustić², Elvir Atić², Armin Muhović²

ASA General hospital Sarajevo¹

University Clinical Center Tuzla²

Background:

Spinal endoscopy procedures has become popular recently as alternative to many open spine procedures with potential advantages over open surgery. Due to its morphologic characteristics and the learning curve thoracic spinal endoscopy remain challenging procedures for many spine surgeons.

Method:

The authors present two unique cases of thoracic spine endoscopy, which were performed for the first time in clinical practice in Bosnia and Herzegovina, highlighting the innovative application and potential risks of this technique in complex spinal pathologies.

The first case was female patient with symptoms of pain, ataxia and significant weakness in lower extremities. After the surgery she found herself much better with minimal pain and improved walking ability immediately after the surgery.

The second case was former professional cyclist in his early fifties. He had previously history of right leg monoplegia due to huge Th12-L1 disc herniation. When he was about to be operated for it he sustained on surgical table pulmonary embolism and surgery was cancelled. After rehabilitation day by day he developed severe spastic paraparesis and hyperreflexis of lower limb caused by calcified thoracic disc herniation. The surgery was performed as in the case of a previously successfully operated female but after the surgery patient developed complete motor weakness of lower leg with no sphincter control.

Conclusion:

Thoracic spine endoscopy needs to be performed by experienced and well trained spine surgeon with intraoperative neuromonitoring, especially in cases with calcified disc.



SESSION 2.:

SPINAL DEFORMITY

Navigation usage in the spinal surgery

Ozkan Ates, Mehmet Yigit Akgun, Tunc Oktenoglu, Ali Fahir Ozer
Koç University Hospital, Department of Neurosurgery, Istanbul, Turkey

Introduction:

In spine surgery, ensuring the safety of vital structures is crucial, and various instruments contribute to the surgeon's confidence. This study aims to present outcomes from spinal cases operated on using the freehand technique and neuronavigation with an O-arm in our clinic. Additionally, we investigate the impact of surgical experience on outcomes by comparing early and late cases operated on with neuronavigation.

Method:

We conducted a retrospective analysis of spinal patients operated on with the freehand technique and neuronavigation in our clinic between 2019 and 2024, with a minimum follow-up of 2 years. Cases operated on with neuronavigation using the O-arm were categorized into early and late groups.

Results:

This study included 393 patients, with 210 undergoing the freehand technique and 193 operated on utilizing O-arm navigation. The first 40 cases with neuronavigation formed the early group, and the subsequent 153 cases comprised the late group. The mean clinical follow-up was 29.7 months. In the O-arm/navigation group, 99% pedicle screws were in an acceptable position, while the freehand group had 89.5% pedicle screws without damage. This rate was 98% in the early neuronavigation group and 99.5% in the late neuronavigation group.

Conclusions:

The use of O-arm/navigation facilitates overcoming anatomical difficulties, leading to significant reductions in screw malposition and complication rates. Furthermore, increased experience correlates with decreased surgical failure rates.

Two-Stage Lumbar Dynamic Stabilization Surgery

Mehmet Yigit Akgun, Ozkan Ates, Tunc Oktenoglu, Ali Fahir Ozer
Koç University Hospital, Department of Neurosurgery, Istanbul, Turkey

Background:

Dynamic lumbar stabilization aims to preserve spinal movement, offering stability and controlled motion. However, screw loosening, especially in patients with osteopenia and osteoporosis, remains challenging.

Method:

Between 2018 and 2022, a retrospective analysis was conducted on a total of 119 patients diagnosed with osteopenia and osteoporosis who underwent spinal dynamic instrumentation surgery. These patients were categorized into two groups: single-stage surgery (n = 67) and two-stage surgery (n = 52). Over the 48-month follow-up period, the occurrence and percentage of screw loosening were examined at each surgical level per patient, as well as by screw location (pedicular, corpus, tip). Clinical outcomes were evaluated using Visual Analog Scale (VAS) and Oswestry Disability Index (ODI) scores.

Results:

Total screw loosening rates were significantly lower in the two-stage group (2.83%) compared to the single-stage group (14.63%, $p < 0.001$). Patient-based loosening occurred in 5 patients (9.6%) in the two-stage group and 16 patients (23.9%) in the single-stage group. Loosening rates were lower in the two-stage group at L2 (7.78%, $p = 0.040$), L3 (5.56%, $p < 0.001$), L4 (8.89%, $p = 0.002$), and L5 (10.00%, $p = 0.006$), but higher at S1 (21.11%, $p = 0.964$), T12 (15.56%, $p = 0.031$), and iliac levels (15.56%, $p = 0.001$). Pedicular section exhibited the highest loosening (37 cases). VAS and ODI scores improved significantly in both groups, with better outcomes in the two-stage group at the 48. months ($p < 0.001$).

Conclusions:

The two-stage surgical approach significantly reduces screw loosening in patients with osteopenia and osteoporosis undergoing dynamic stabilization surgery, offering enhanced stability and better clinical outcome.

Surgical treatment of severe spinal deformities

Prof. Cagatay Ozturk (Invited lecture)
LIVGROUP, Istanbul, Turkey



Robotic Spine Surgery for Complex Deformity Cases

Alexandru Thierry, Raluca Ghita



Degenerative lumbar scoliosis (DLS) – final stadium of spine aging

Mirza Bišćević

Introduction:

DLS is final phase of spine aging. Aim of this study was to present spine aging in different phases, its accelerating factors, possibilities of treatment.

Patients and methods:

Including criteria were: degenerative deformity of lumbar spine with pronounced symptoms that indicated surgical treatment. Totally 205 patients were analyzed with minimal follow up of 2 years (2-15).

Results:

Average age was 71 years, female gender 69%, average BMI 32, comorbidities at 81%. At the final follow up, 94% of them were able to walk independently, rest of them could not due to neurological and other comorbidities. All patients had significantly reduced pain level, and improved mobility. Mortality rate in first month was 1%, and overall revision rate was 15 % due to wound dehiscence and epidural haemathoma; later revisions were performed due to „adding on“, implant loosening, etc.

Discussion:

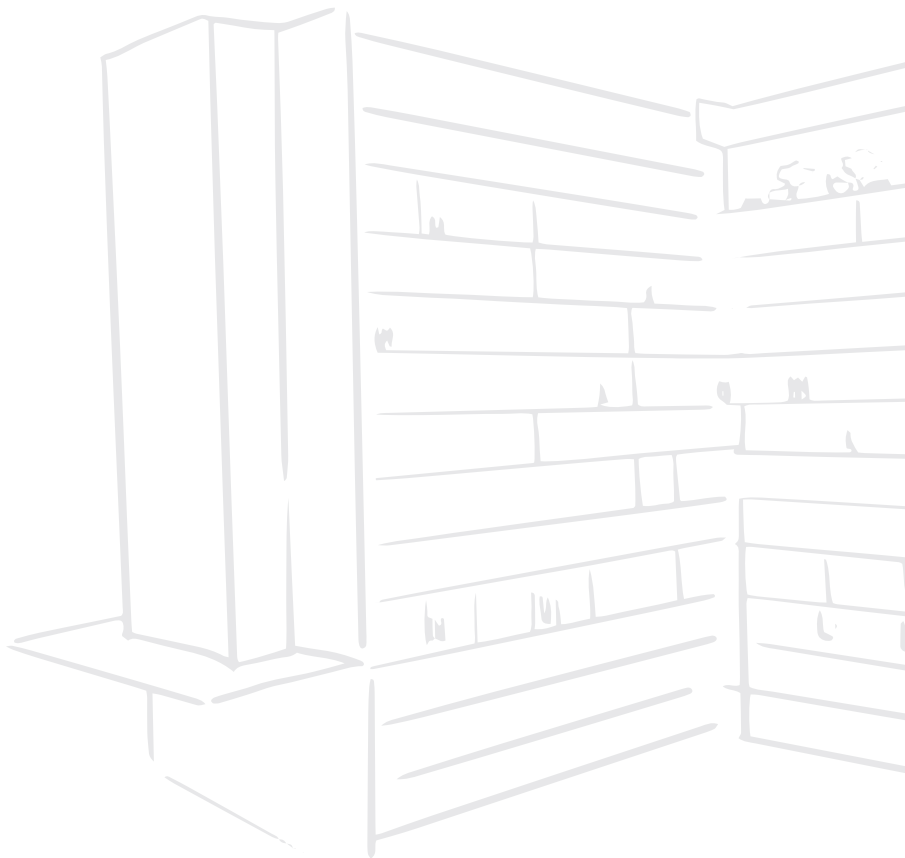
DLS affects mostly obese patients with other comorbidities, additionally reducing their functional status. Process is not limited on 1 or 2 spine levels but on whole L spine. Aim of surgery is not only to restaurate balance (more important sagittal), but also to stabilize spine and decompress neural structures. Such interventions are very complex, aggressive, and risky. If done properly it dramatically improve patient's life, still complication rate are high.

Conclusion:

Patient selection and her/his cooperation (weight reduction, muscle exercising, control of other diseases, rehabilitation process) are essential for long-term success of this intervention.

Complications and management of spine surgery over the age of 60

Ufuk Aydinli







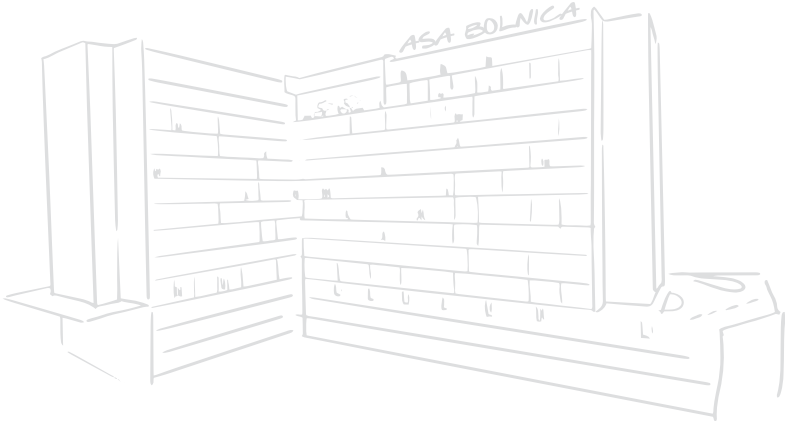
SESSION 3.:

SPINAL DEFORMITY

2nd part

Non fusion deformity surgery

Prof. dr. Mehmed Aydogan (Invited lecture)
MEMORIAL Hospital, Istanbul, Turkey



Gait biomechanics in sagittal adult spinal deformity

Armand Dominik Škapin

Degenerative spine disease is increasingly prevalent in aging populations, often resulting in progressive kyphosis and compromised sagittal balance due to disc dehydration. While conservative treatment remains the primary approach, surgical intervention may be necessary in severe cases. Achieving proper sagittal alignment during surgery is crucial, typically guided by measurements from preoperative full-spine sagittal x-rays. However, this information is gathered during a short period of forced upright stance while the x-ray imaging is performed and does not always demonstrate true sagittal balance status of the patient. Compensatory mechanisms can maintain normal sagittal balance through x-ray imaging, but can sometimes fail to do so during gait. So sometimes the true sagittal balance can only be observed during physical activity, when muscles of compensatory mechanisms fatigue.

With our study, we aimed to compare sagittal balance measured from preoperative x-rays with that observed during gait in patients with sagittal imbalance (positive PI-LL or SVA) and healthy controls. A total of 64 participants (33 patients and 31 controls) underwent x-ray imaging, completed clinical questionnaires (Oswestry Disability Index, EQ-5D-5L, and VAS scale), and performed a gait test. During the test, 49 body markers were attached to predefined points on their bodies and tracked by multiple cameras as participants walked continuously for six minutes. By analyzing sagittal balance dynamics during gait, the study also seeks to identify preoperative diagnostic parameters, such as radiological or clinical metrics, that predict declines in sagittal balance during physical activity.

Selective thoracic fusion (STF) – best invasiveness/correction ratio

Mirza Bišćević

Introduction:

Although scoliosis mostly affects thoracic spine, many time surgeons fuse some lumbar vertebrae. Reduced number of free lumbar segments leads to accelerated degeneration of free ones. Aim of this work was to present how we can achieve satisfactory scoliosis correction without instrumentation of L spine in vast majority of patients.

Patients and methods:

We have analyzed 149 patients whom we have done STF during last 12 years, with minimal follow up of 2 years (8,4). Including criteria were: primary Th curve with compensatory L curve, flexible L curve with Cobb $<50^\circ$, Th>L curve (type King II). Surgical technique was posterior corrective spondylodesis Th4-Th12 with surgeon-directed MEP IONM.

Results:

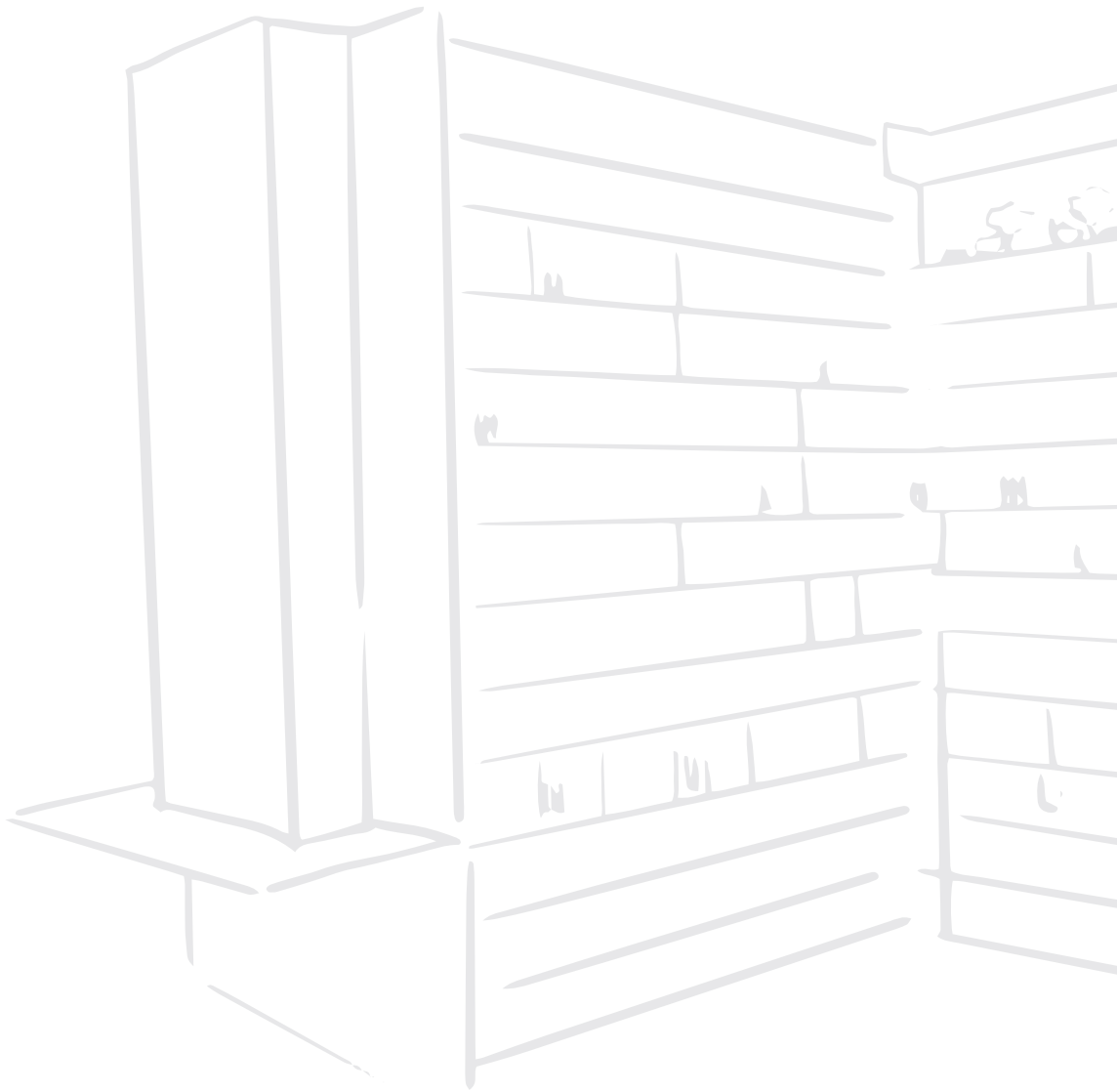
Postoperative balance and deformity corrections was established in all patients, L curve was disappeared, brace was needed an 31 patients (20%) 3-6 months, average SRS22r score was $3,7 \pm 0,6 / 83 \pm 19$. There were no infections, emboli, neither implant loosening and neurological deficit complications.

Discussion and conclusion:

Reduction of surgical exposure and free L spine are logical imperative in prevention of late disturbances (pain, loss of balance, revisions). Most of AIS patients that fulfil requirements for STF have fused 9,3 Th segments and skin scar of 26,5cm, no pain, and not reported restriction in any activities.

Revision of scoliosis cases which operated previously

Ufuk Aydinli







SESSION 4:

SPINAL TRAUMA AND CASE REPORTS

Timing of spinal surgery in polytrauma patients

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Introduction:

Spinal injuries (SI) frequently occur in polytraumatized patients (PTP), making the evaluation and treatment big challenge for the trauma team. The timing and extent of surgery of spinal injuries in these patients has to be appropriately planned to avoid systemic complications. Although there are protocols for evaluation and treatment of polytrauma patients, the heterogeneity and severity of the injuries makes these protocols hard to be clinically applied.

The **purpose** of this study is to present our approach in spinal injury evaluation process simultaneously with resuscitation, as well as determination of endpoint of resuscitation and breakpoint in selection of the surgical treatment options (early-DCO/ETC/EAC or late).

Material and methods:

We have analyzed records of 105 PTP with SI surgically treated in our hospital from 2012 to 2024, regarding mechanism, diagnostic protocol, associated injuries, ISS, radiological and neurological findings, treatment and outcome. We identified 37pt with cervical, 59 with thoracolumbar injury, 9 with spinopelvic dissociation. All of them had MSCT by polytrauma protocol as first diagnostic tool. ASIA scale was used for neurological impairment grading.

Results:

Of all, 42 were operated in the first 24-36h (early-ETC/EAC). The rest 63 after 3-22 days (late). Mean ISS was 32. Determination of the endpoint of resuscitation and breakpoint for surgery depended on stabilization of the vital parameters, but most sensitive were Lac<2,5 mmol/l; BE -2 to +2 mmol/l, pH \geq 7,25. In the early group length of hospitalization was 12,5 days, in the late 26 days. Neurological impairment was found in 48% of the patients in the early group, in 42% in the late group. Complications (SIRS, MOF, infections, pneumonia, pressure sores) were lower in the early group. There were 2 deaths in the early group during COVID pandemic.

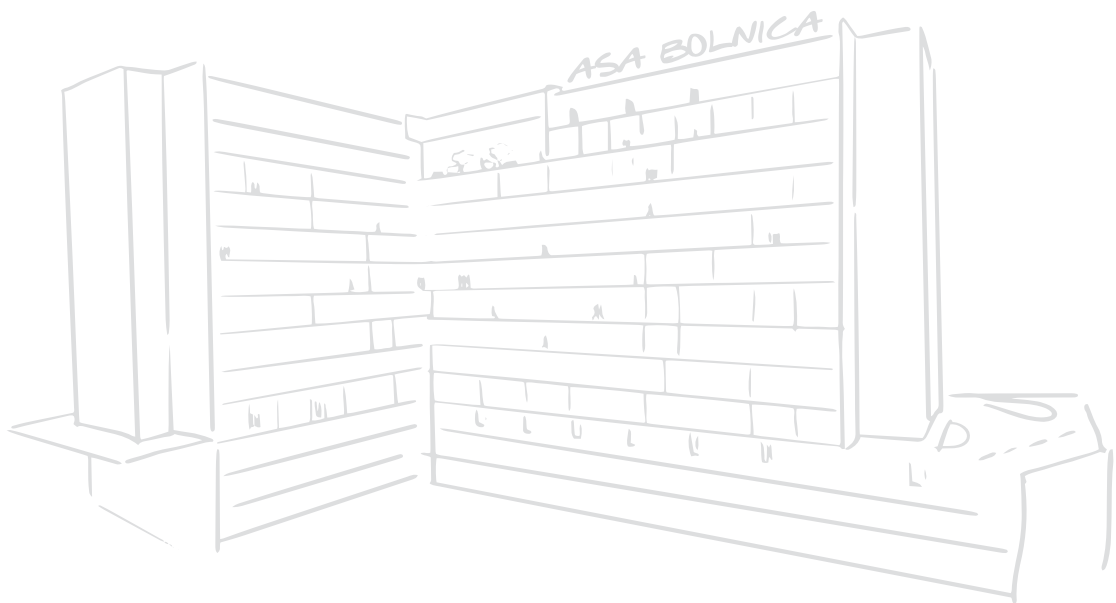
Conclusion:

Determination of surgical priorities, extent of surgery, planning and optimal timing for fracture stabilization is essential in the treatment of PTP with SI.

- ETC/EAC has an advantage in many stable polytrauma patients.
- DCO increases the chances for survival in hemodynamically unstable and patients with high risk.
- Each PTP should be individually assessed, while insisting on safe treatment.

Augmentation and minimal invasive surgical treatment in osteoporotic spine fractures

Prof. Cagatay Ozturk (Invited lecture)
LIVGROUP, Istanbul, Turkey



Complete thoracolumbar fracture – dislocation: timing of surgery and factors that affect treatment

Faruk Lazović, Dario Ivanišević, Mehmed Zahirović, Benjamin Kaknjašević

Introduction:

Dislocated thoracolumbar fractures represent a critical area in spinal trauma due to the complex anatomy and biomechanical significance of this region. Preservation of neurological function following complete fracture dislocation is quite rare entity. Studies have shown that early surgical intervention can improve outcomes in patients with severe dislocated thoracolumbar fractures, particularly when there is a risk of progressive neurological deterioration. Stabilizing the spine and decompressing neural structures are often the primary objectives of surgical treatment, aimed at restoring spinal alignment and preventing further injury. Postoperative rehabilitation is also essential, focusing on restoring mobility, strength, and function to facilitate the patient's return to daily activities

Objective:

We present cases with a similar pattern but with different mechanisms of occurrence and the presence of associated injuries.

Conclusion:

Early stabilization of fractures (within 24 hours) is generally ideal to minimize complications and improve outcomes. However, in cases where there are severe associated injuries—such as traumatic brain injuries, thoracic or abdominal injuries, or hemodynamic instability—immediate stabilization may be delayed. It can improve neurological status, reduce complications such as respiratory failure and decrease overall ICU and hospital stay. Treatment in polytraumatized patients requires collaboration among trauma surgeons, neurosurgeons, orthopedic surgeons, intensive care specialists, and rehabilitation therapists.

Thoracic bilateral facet dislocations – challenges with reduction maneuvers

Stjepan Dokuzović, Jure Pavešić, Stipe Ćorluka, Igor Bebek, Stjepan Ivandić

Background and Objectives:

Thoracolumbar fracture–dislocations (AO type C) are rare injuries that occur due to high-energy trauma, and the result is translational and rotational instability of the spinal column and neurological impairment. Several reduction maneuvers have thus far been published, each of which can be of use in certain specific situations. We developed a modification to the previously described reduction technique.

Materials and Methods:

This is a case study on the management of thoracic AO type C fracture–dislocations managed with a modified reduction technique. The success of the reduction and intraoperative iatrogenic complications such as dural tear and screw pull out were the outcomes analyzed.

Results:

A total of four cases were successfully reduced with this described reduction technique. We did not note any complications such as a dural tear or screw failure with this modified reduction technique.

Conclusions:

A modification to the reduction technique employed in the management of thoracic fracture–dislocations resulted in a successful reduction without the risk of iatrogenic complications due to the reduction maneuver.

Intraspinal pressure after spinal cord injury

Cene Kopač, Marko Jug

University Clinical Centre Ljubljana, Ljubljana, Slovenia

Spinal cord injury (SCI) is a devastating event for a patient and a great burden on healthcare. Recent guidelines suggest early spinal cord decompression and a target mean arterial pressure (MAP) of 75-80 mmHg to 90-95 mmHg for 3-7 days. Spinal cord perfusion depends on MAP, intraspinal pressure (ISP) and spinal cord perfusion pressure (SCPP). The objective of our study was to test the feasibility and safety and monitor the ISP in patients with SCI in the first days after SCI. We intraoperatively introduced an ISP probe (Raumedic, Neurovent 2L PTO) in the subarachnoid space at the site of injury and monitored ISP, MAP, spinal cord perfusion pressure (SCPP) and oxygen partial tissue pressure (pO₂) with a bedside monitor (Raumedic, MPR log2O DATA LOGGER) in the intensive care unit for 5 consecutive days after surgery. Surgery and monitoring related complications were recorded and neurologic recovery was assessed. No complications such as meningitis, cerebrospinal fluid leak, wound infection, or hematoma were observed. ISP monitoring could lead to optimization of MAP and SCPP without increasing the risk of perioperative complications. Furthermore with appropriate additional treatment eg.duroplasty we can improve SCPP and mitigate the formation of secondary spinal cord injury and positively influence the neurological outcome.

Spinopelvic fixation in sacral fractures. Is it enough, or we need to enhance the construct to triangular

Ilir Hasani



Thoracolumbar corpectomy and cage subsidence: our experience

Asist. Jošt Kokalj, dr.med., trauma surgeon
University medical center Ljubljana, trauma department

Introduction:

Disorders of the thoracolumbar spine, such as trauma, neoplasms, or infections, may lead to instability and require surgical intervention. Posterior spinal fixation followed by anterior corpectomy provides rigid anterior column support, prevents posterior implant failure, and helps maintain sagittal alignment

Materials and Methods:

We retrospectively evaluated the radiographs of cases performed over the last six years.

Results:

Thirty corpectomies with expandable cages were performed. Subsidence was noted in 3 cases (10%). One patient required additional surgery. No other complications were observed.

Conclusion:

Anterior column reconstruction with expandable cages appears to be an effective treatment modality. In our patients, we found a relatively high rate of cage subsidence, likely related to the contact area on the end plate, as previously reported in the literature. Other complications were not observed, but the case series is small.

Spinal epidural haematoma – conservative vs. surgical treatment

Stjepan Dokuzović, Stipe Ćorluka, Jure Pavešić, Stjepan Ivandić, Igor Bebek

Introduction:

Postoperative epidural hematomas of the cervical and thoracic spine can pose a great risk of rapid neurological impairment and sometimes require immediate decompressive surgery.

Case Report:

We present the case of a young patient operated on for stabilization of a two-level thoracic vertebra fracture who developed total paralysis due to a hyperacute epidural hematoma postoperatively. The course of epidural hematoma was quickly reversed with the help of a conservative technique that prevented revision surgery. The patient regained complete neurologic function very rapidly, and has been well on every follow-up to date.

Conclusion:

There is a role of similar maneuvers as described in this case to be employed in the management of postoperative epidural hematomas. However, prolonged watchful waiting should still be discouraged, and patients should remain ready for revision surgery if there are no early signs of rapid recovery.

Aggressive haemangiomas – what is the appropriate treatment?

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Chair of orthopedics, Medical faculty, University of Ljubljana

Introduction:

A small proportion of spinal haemangiomas have the tendency to act as aggressive benign lesions and traverse the cortical bone, causing clinical problems with the surrounding anatomical structures, predominantly neural compression.

Methods:

We present an overview of treatment options for aggressive haemangiomas based on the multidisciplinary approach. The options comprise of radiotherapy, surgery (bone cement augmentation, intralesional resection, en-blok resection), a combination of both, or novel local chemo-agents. The use of different treatment modalities depends on the presentation of the patient and the lesion itself. The appropriate treatment is usually opted by a multidisciplinary team.

Results:

We present our clinical cases and experiences with aggressive haemangiomas. A case of a large lesion causing back pain, two cases of aggressive haemangiomas causing neural compromise with myelopathy, that receded after the first surgery, and a case of an inoperable haemangioma of the cervical spine, treated solely by radiotherapy.

Conclusion:

The aggressive haemangioma may cause severe clinical symptoms, predominantly neural compromise, myelopathy and para/tetra paresis. In cases of extraosseal extension, a multidisciplinary approach should choose the best possible treatment modality to cure the patient. Recurrence is common when inappropriately treated.

Surgical Management of Spinal Tuberculosis in Pediatric Patients: A Case Series

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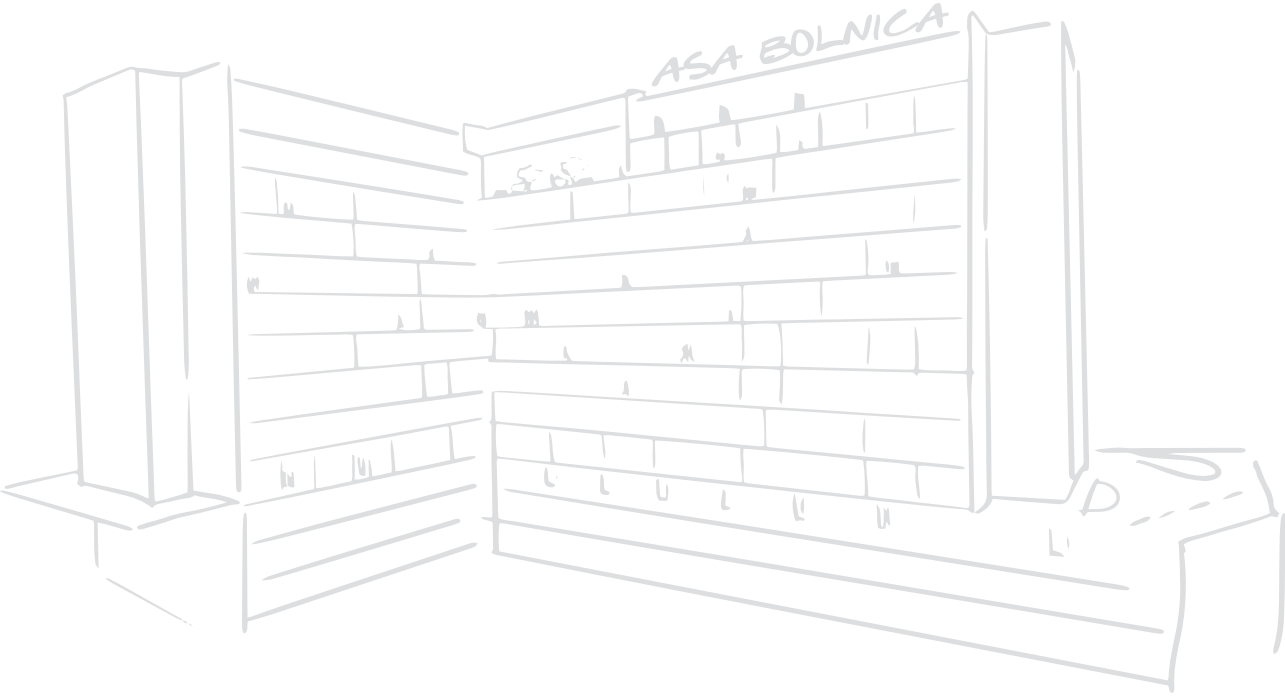
Raluca Ghiță, MD, PhD

attending surgeon, pediatric orthopedics & spine, Monza Hospital, Bucharest

Pott's disease, a form of extrapulmonary tuberculosis affecting the spine, presents unique challenges in pediatric patients, particularly those under five years old. This study reports on four cases of acute unstable spinal tuberculosis and one case of post-tubercular evolving kyphotic deformity, each exhibiting extensive vertebral body destruction across three or more levels. Our methodology included a posterior lateral extravertebral approach for four patients, while one patient underwent a combined anterior (cervico-thoracic) and posterior approach, followed by spinal fusion with or without anterior support. Postoperative evaluations demonstrated successful outcomes, with all patients maintaining balance in both coronal and sagittal planes and without the emergence of new neurological deficits. Notably, complications included one intraoperative aortic lesion, one instance of postoperative paradoxical breathing—likely related to the ligation of thoracic nerve roots—and a fracture of the anterior graft three years post-surgery. Given the inherent risk of instability and kyphotic deformity progression in small children due to softer bone and weaker ligaments, surgical intervention is recommended for patients exhibiting a Tuberculosis Spine Instability Score greater than 10. Our findings underscore the necessity for timely and appropriate surgical management in pediatric spinal tuberculosis to mitigate neurological risks and improve clinical outcomes.

Managing acute spinal cord compression in metastasis of unknown origin – weekend admission

Ufuk Aydinli



Decision framework for metastatic spine

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Abstract:

Patients with metastatic disease of the spine are a very unique patient for spine surgeons. During the past years, several frameworks have been developed for determining the most optimal treatment in these patients such as the Tomita and Tokuhashi score, NOMS (neurologic, oncological, mechanical, and systemic) framework and novel MOSS (medical/mental, oncological, stenosis, stability). Retrospectively, we analysed patient with metastatic spinal disease treated in our institution during period from 2018 to 2023 year. With the increased survival of oncologic patients, evaluation and management of patients with spinal metastasis is crucial to reducing morbidity and maximizing function.

Prophylactic use of vancomycin powder reduces postoperative infection rates after lumbar spondylodesis

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Introduction

Postoperative infections remain a significant challenge in spinal surgery, potentially leading to prolonged hospital stays, increased costs, and additional interventions. This study evaluates the efficacy of prophylactic vancomycin powder in reducing infection rates following lumbar spondylodesis.

Methods

We retrospectively analyzed 282 patients who underwent lumbar spondylodesis (PLIF) at our institution between January 2022 and June 2024. Patients were divided into two groups: Group 1 (study group) consisted of 107 patients that received topical vancomycin powder applied to the epidural space and subcutaneous tissue prior to wound closure. Group 2 (control group) consisted of 175 patients that did not receive topical vancomycin powder during the surgery. No significant differences were observed between the groups regarding age, BMI, diabetes prevalence, smoking status or fused levels involved. Postoperative infection rates and the need for reoperations due to infection were assessed.

Results

In Group 1, deep infection rates were 1.87%, and superficial infection rates were 3.74%. In contrast, Group 2 had a deep infection rate of 9.14%. The percentage of patients requiring reoperation due to infection was 5.61% in Group 1, compared to 9.14% in Group 2.

Conclusion

This retrospective analysis demonstrates that the prophylactic application of vancomycin powder during the final stages of lumbar spondylodesis significantly reduced both deep and overall infection rates in our cohort. These findings support the use of vancomycin powder as an effective adjunct in preventing infections in spinal surgery. Further studies, including prospective trials, are recommended to validate these results and explore optimal dosing and application techniques.

Treatment of polymicrobial postoperative spinal infection – case report

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No matter early or late, monomicrobial or polymicrobial, postoperative spinal infections are one of the most devastating complications. Many studies, systematic reviews, meta analyses were published, even algorithms were created, but still there is no clear consensus regarding treatment in the spinal community.

We present 19 years old male patient injured in a motor vehicle accident, 3 days before admission treated in another hospital. Spinal injury (L2 fracture) was missed, right femur fracture was diagnosed and patient was transported with plaster immobilization.

On admission CT angiography was done, immediately followed by MR flebography because of free floating thrombus in the right popliteal vein, app 15 cm long. Urgent thrombectomy was done by a vascular surgeon, followed by intramedullary fixation of the right femur fracture.

Few days later, transpedicular fixation of Th12-L3 segment was done because of the need of verticalization and mobilization of the patient. Next day signs of infection at the femur surgical wounds was seen, multiple revisions of the wounds were indicated, with antibiotic therapy according antibiogram. A week later, signs of infection at the spinal wound were seen, immediate surgical revision was indicated.

Seven months later, after isolation of many bacterias, multiple surgical interventions, including removal of the spinal implants, VAC applications, intravenous antibiotic therapy, plastic surgery for reconstruction of soft tissue defect, the treatment was finished.

Spinal postoperative infections are not rare, but surgical persistence is of uttermost importance when dealing with such cases, since the treatment is a long story to keep it short. One should be prepared to meet lot of burdens, disappointments, and bad results until successful end of the treatment is reached.

Dural leakage. What is the best treatment?

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ASA General hospital Sarajevo¹
University Clinical Center Tuzla²

Background:

Incidental dural tear is one of the possible complications in spinal surgery with most reports of 3% in primary cases and around 20% in revision cases.

There are several techniques how to treat it, from conservative to immediate surgical closure.

Case report:

The authors present a case of female patient in which several revision surgeries performed. The first one was posterior posterolateral instrumented fusion of L4-S1. After the surgery she experienced left leg radicular pain and too long S1 screw had to be changed with a shorter one. A year after she was fused to L3-L4. Despite all measures female patient continued to complain on a lower back pain. She wanted implants to be removed. A year later during removal of implants slipped screw driver accidentally caused small dural tear defect. She was treated by resting in bed for 5 days when she had to be revised again due to clinically established dural leakage. The small punctured defect of dura was closed with stiches and fibrin glue. She rested in bed but dural leakage occurred again. The new defect was filled with haemathoma, sutured and covered by fibrin glue. On a 7th day she was discharged from hospital. 3 months later she did MRI who revealed a new fluid collection without clinical consequences.

Conclusion:

Despite several conservative and operative technique has been described after this case authors are not sure what from those is the best one.



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